



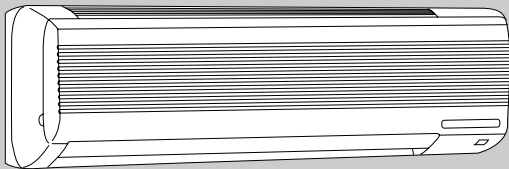
SPLIT-TYPE AIR CONDITIONERS

No. OB228

SERVICE MANUAL

Wireless type
Models

MS-18NV - **E4** (WH) ▪ **MU-18NV** - **E4**

MS-18NV - **E4**

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1 TECHNICAL CHANGES

MS-18NV -E3→MS-18NV -E4

1. Indoor electronic control P.C. board has changed.

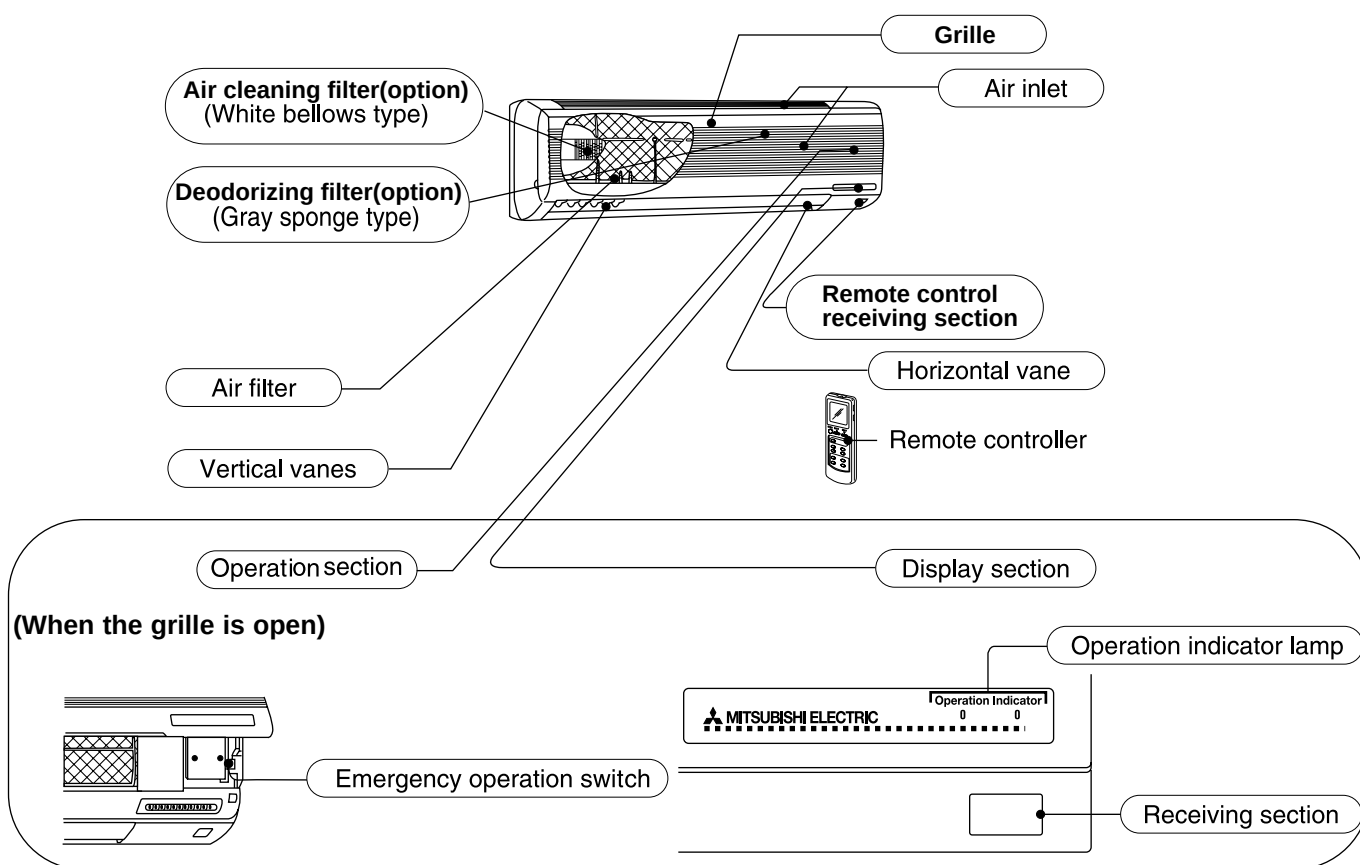
MU-18NV -E3→MU-18NV -E4

1. Compressor has changed.(NH-33VMDT→PH-33VPET)
2. Outdoor heat exchanger has changed.
3. Refrigerant filling capacity(R-22) has changed.(1.65kg→1.05kg)

2 PART NAMES AND FUNCTIONS

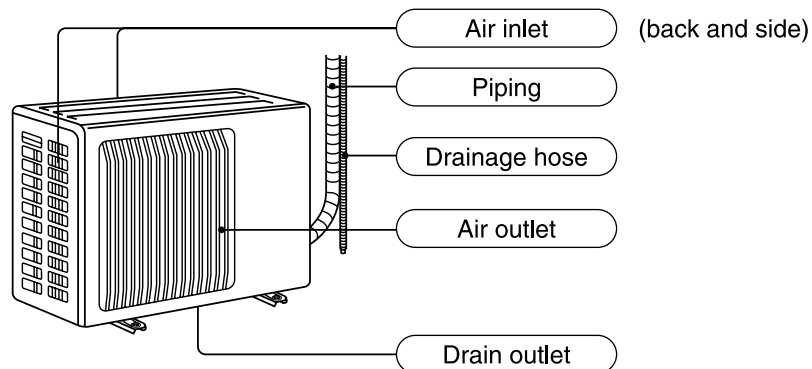
INDOOR UNIT

MS-18NV -E4



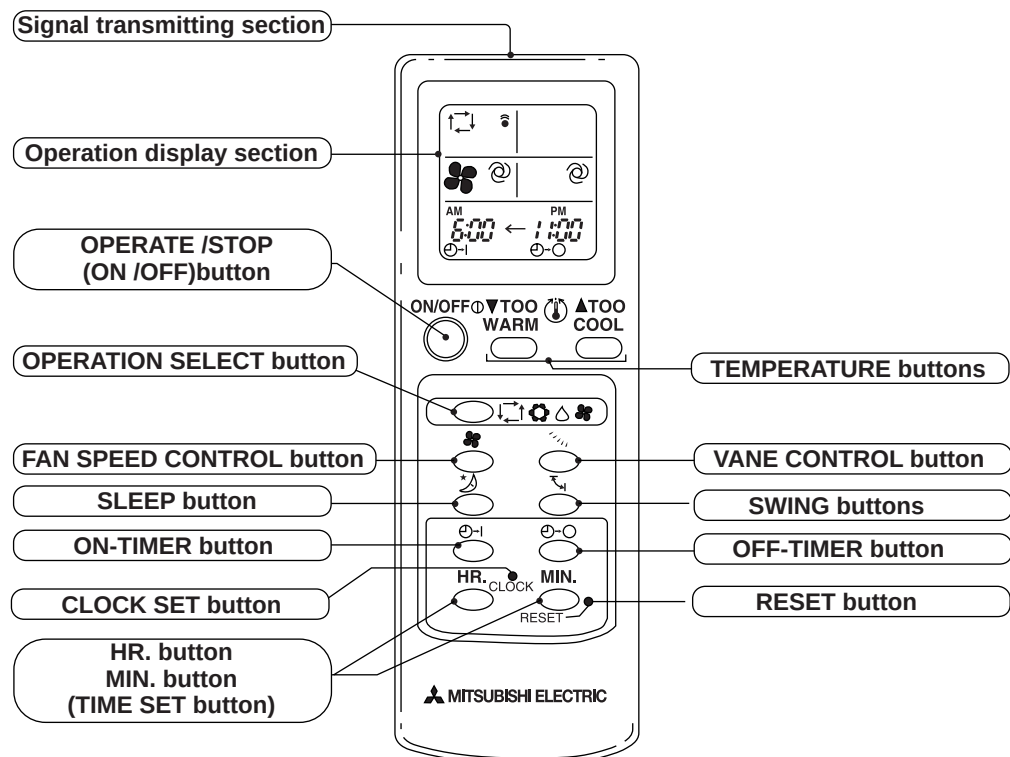
OUTDOOR UNIT

MU-18NV - E4



REMOTE CONTROLLER

MS-18NV - E4



Model				MS-18NV - E4
Function				Cooling
Power supply				Single phase, 220-240V, 50Hz
Capacity	Capacity	kW		5.1
	Dehumidification	ℓ /h		2.5
	Air flow(Hi)	m³ /h		INDOOR 756 / OUTDOOR 2340-2400
Electrical data	Power outlet	A		15
	Running current	A		9.1
	Power input	W		1,910-2,010
	Auxiliary heater	A(kW)		—
	Power factor	%		95-92
	Starting current	A		51-55
	Compressor motor current	A		8.46
	Fan motor current	A		INDOOR 0.25 / OUTDOOR 0.39
Coefficient of performance(C.O.P)				2.67-2.54
Compressor	Model			PH-33VPET
	Output	W		1,500
	Winding resistance(at20°C)	Ω		C-R1.08 C-S 2.18
Indoor fan motor	Model			RA4V27-EA or EF
	Winding resistance(at20°C)	Ω		WHT-BLK183.8 BLK-RED250.5
Outdoor fan motor	Model			RA6V50-OF or OG
	Winding resistance(at20°C)	Ω		WHT-BLK116.4 BLK-RED111
Dimensions	Indoor unit	Width	mm	1,015
		Height	mm	320
		Depth	mm	190
	Outdoor unit	Width	mm	850
		Height	mm	605
		Depth	mm	290
Weight	Indoor unit	kg		14
	Outdoor unit	kg		48
Special remarks	Air direction			5
	Sound level (Hi)	Indoor unit	dB	42
		Outdoor unit	dB	52
	Fan speed (Hi)	Indoor unit	rpm	1,180
		Outdoor unit	rpm	830-860
	Fan speed regulator	Indoor unit		4
		Outdoor unit		1
	Refrigerant filling capacity(R-22)		kg	1.05
	Refrigerating oil (Model)		cc	900 (MS32N1)
	Thermistor	RT11(at25°C)	kΩ	10
		RT12(at25°C)	kΩ	10

NOTE:Test conditions

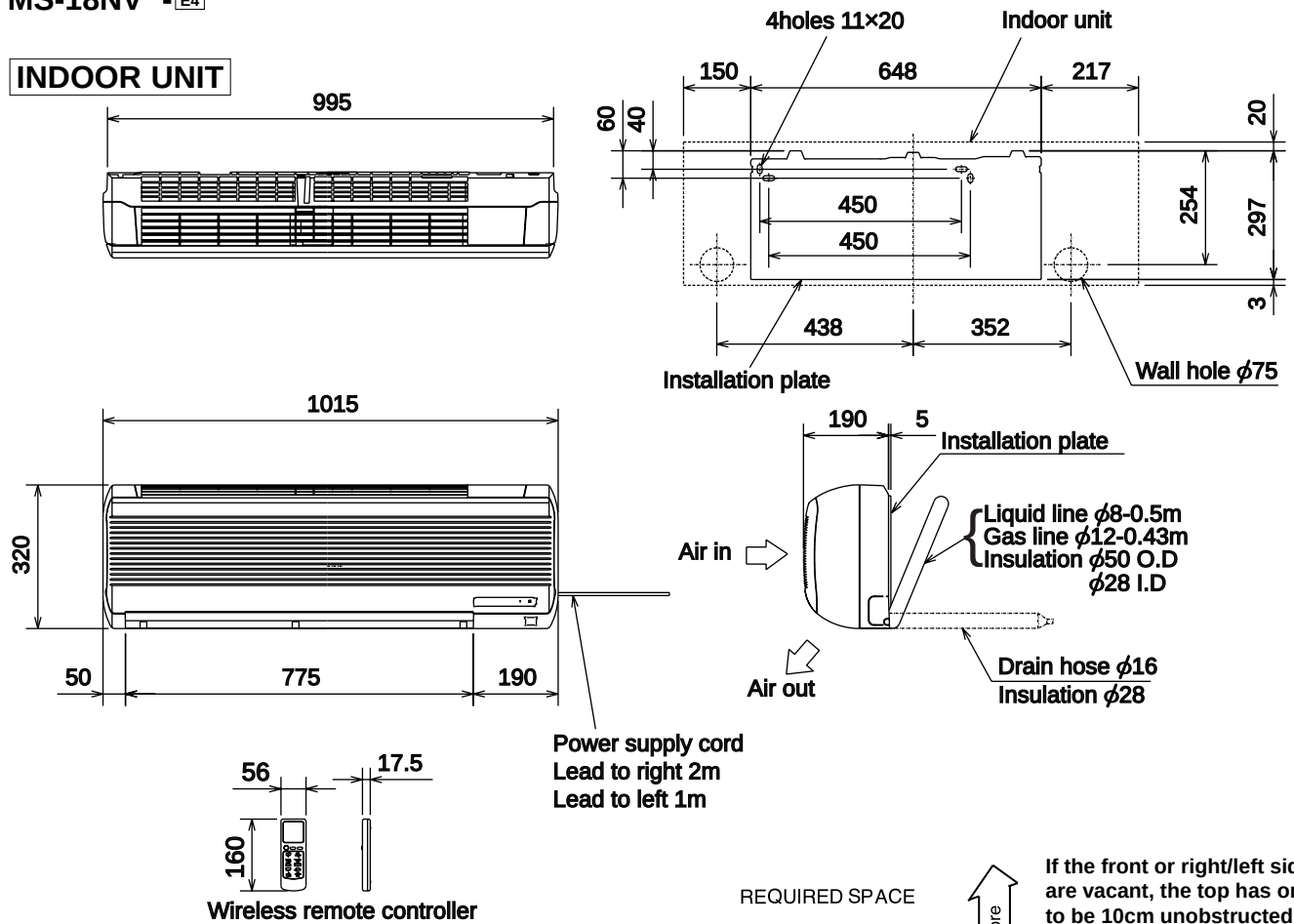
Cooling : Indoor DB27°C / WB19°C

Outdoor DB35°C / WB24°C

MS-18NV - [E4]

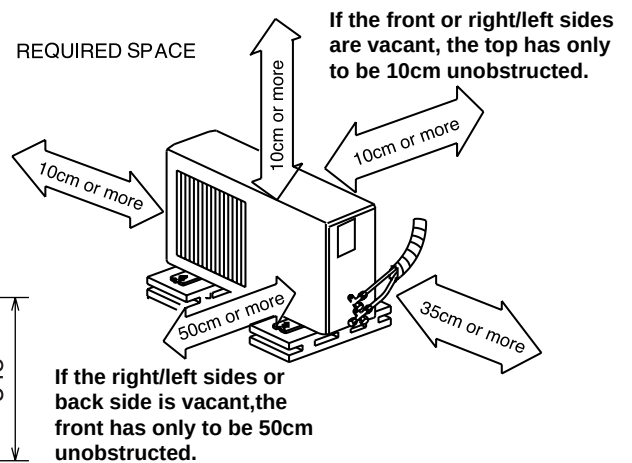
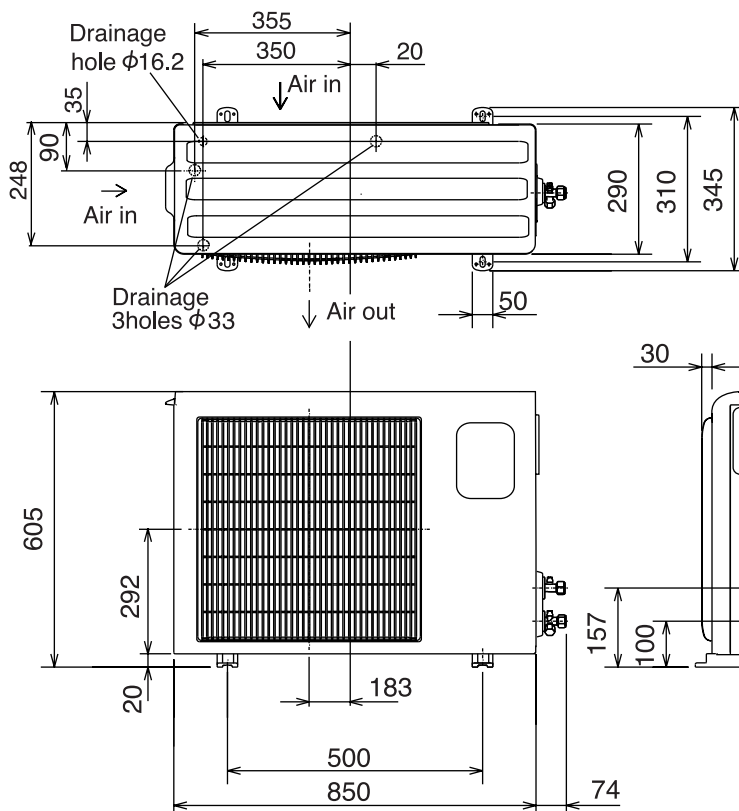
Unit : mm

INDOOR UNIT



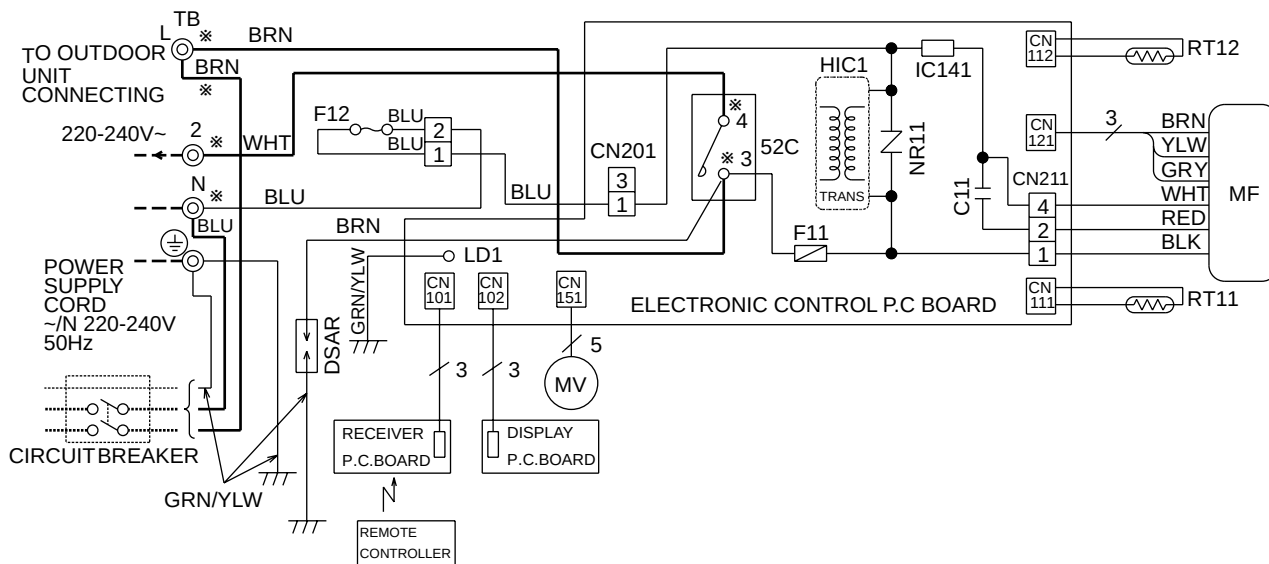
MU-18NV - [E4]

OUTDOOR UNIT



MS-18NV -[E4] MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	IC141	HYBRID IC	RT12	INDOOR COIL THERMISTOR
DSAR	SURGE ABSORBER	MF	INDOOR FAN MOTOR	TB	TERMINAL BLOCK
F11	FUSE(3.15A)	MV	VANE MOTOR	52C	CONTACTOR
F12	THERMAL FUSE(93°C)	NR11	VARISTOR		
HIC1	DC / DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.

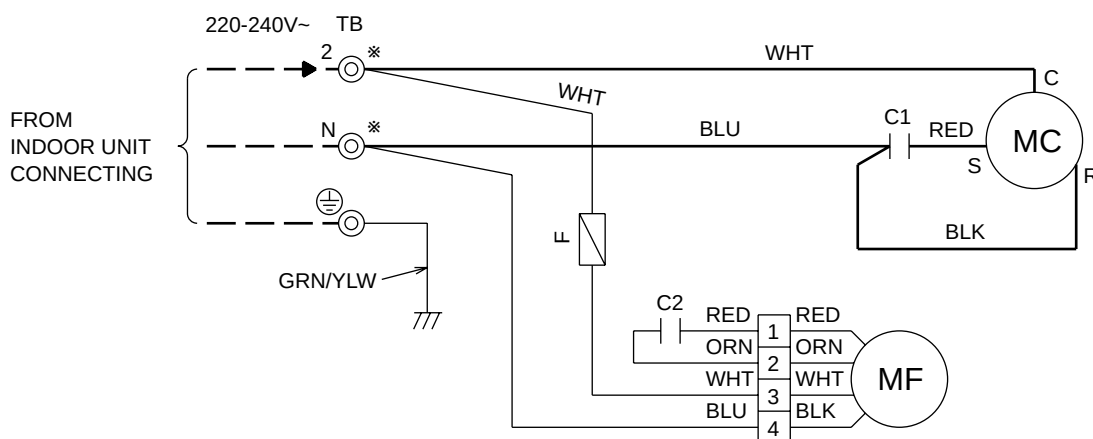
2. Use copper conductors only.(For field wiring)

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MU-18NV -[E4]

OUTDOOR UNIT MODEL WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	F	FUSE(2A)	MF	OUTDOOR FAN MOTOR(INNER THERMOSTAT)
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR(INNER THERMOSTAT)	TB	TERMINAL BLOCK

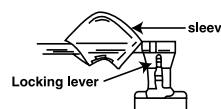
NOTE:1. Use copper conductors only.(For field wiring)

2. "*"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.

Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector



1.Slide the sleeve.

2.Pull the wire while pushing the locking lever.

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REFRIGERANT SYSTEM DIAGRAM

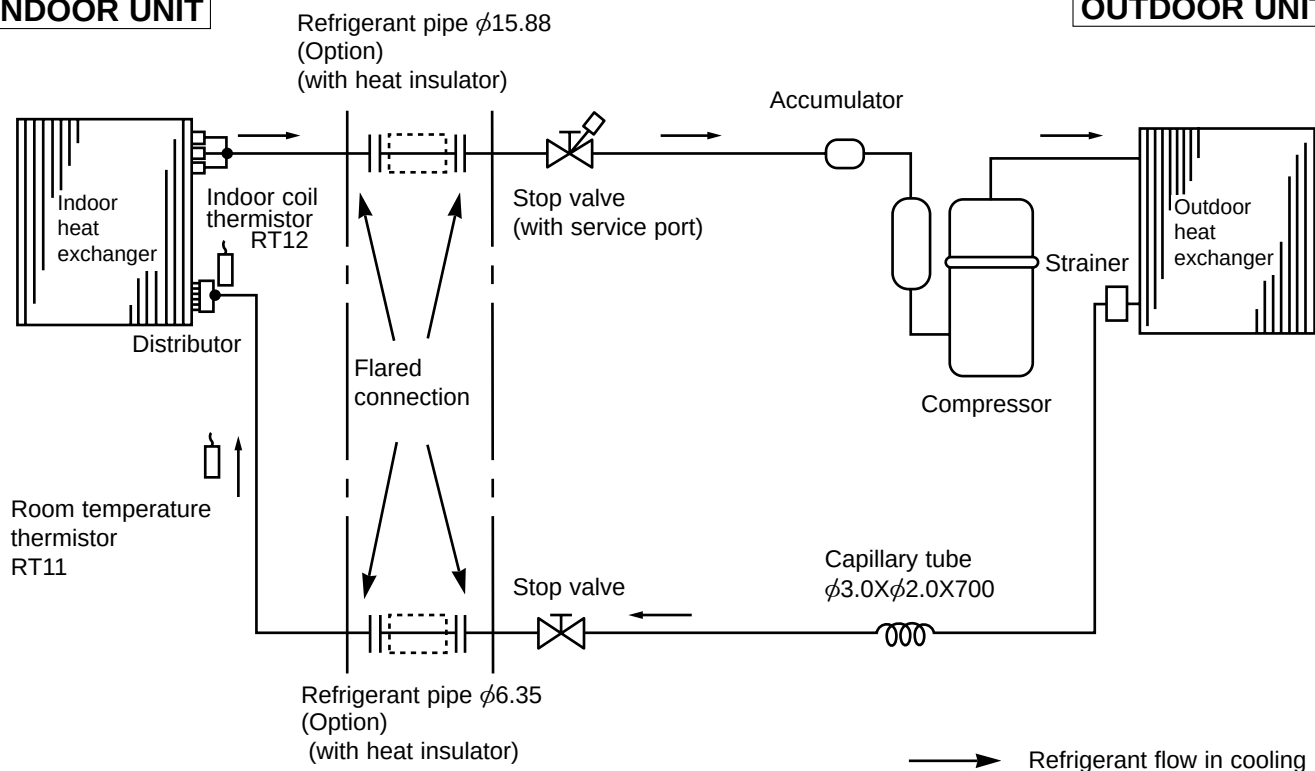
Unit:mm

MS-18NV - [E4]

MU-18NV - [E4]

INDOOR UNIT

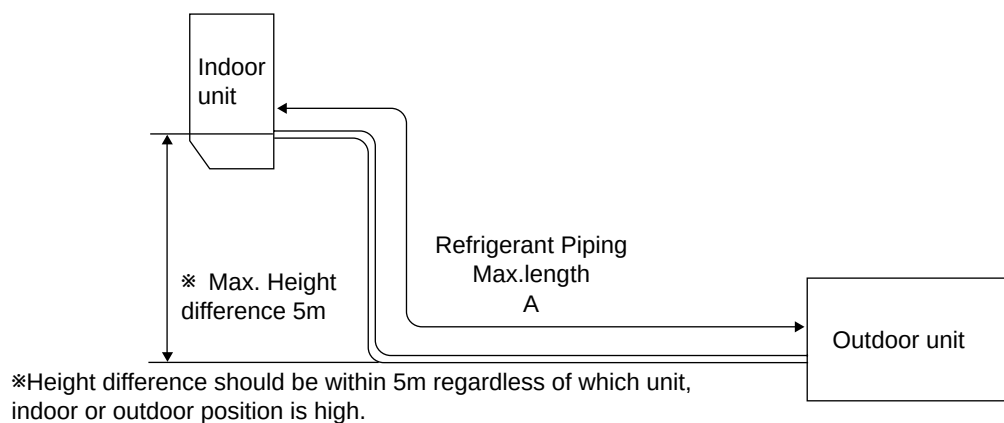
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MS-18NV - [E4]	15	15.88	6.35	Gas 0.43 Liquid 0.5	Gas 0 Liquid 0

MAX. HEIGHT DIFFERENCE



ADDITIONAL REFRIGERANT CHARGE(R-22 : g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)		
		7m	10m	15m
MS-18NV - [E4]	1050	0	45	120

Calculation : $Xg=15g/m \times (A-7)m$

MS-18NV -[E4]

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

Rated voltage : $\pm 10\%$ (198 ~ 264V), 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

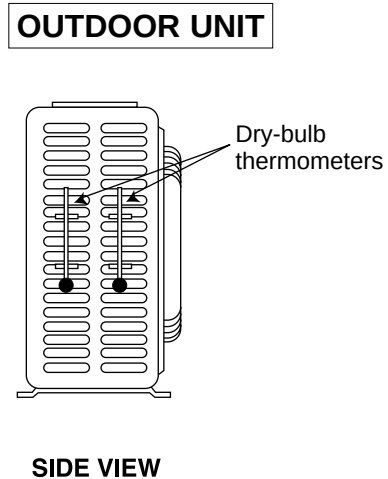
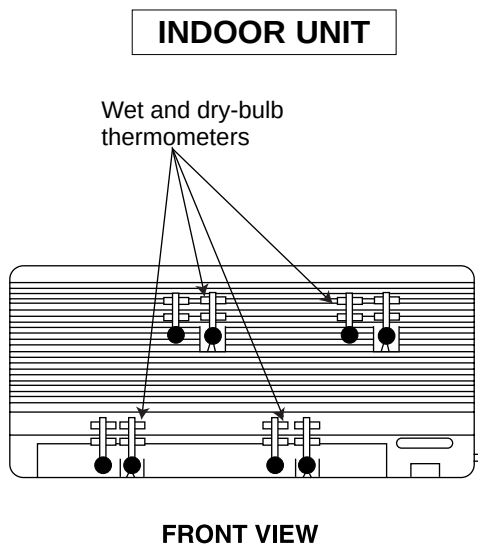
(3) MAIN READINGS

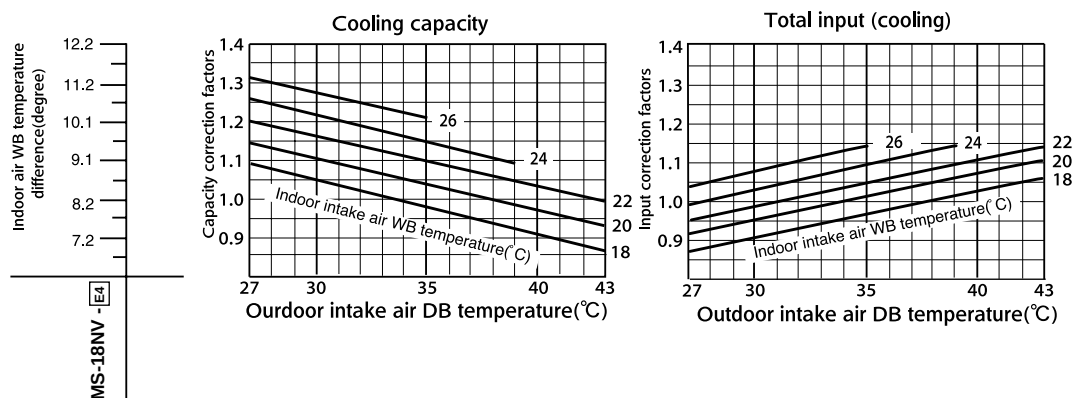
(1) Indoor intake air wet-bulb temperature	: °CWB	} Cooling
(2) Indoor outlet air wet-bulb temperature	: °CWB	
(3) Outdoor intake air dry-bulb temperature	: °CDB	
(4) Total input	: W	

Indoor air wet-bulb temperature difference on the left side of the chart on next page shows the difference between the indoor intake air wet-bulb temperature and the indoor outlet air wet-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb temperature difference

1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of dry-bulb thermometers to the outdoor air inlet. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch to start the EMERGENCY operation.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.





OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

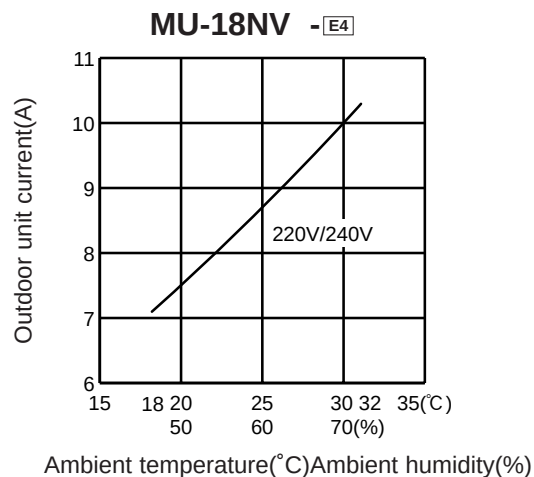
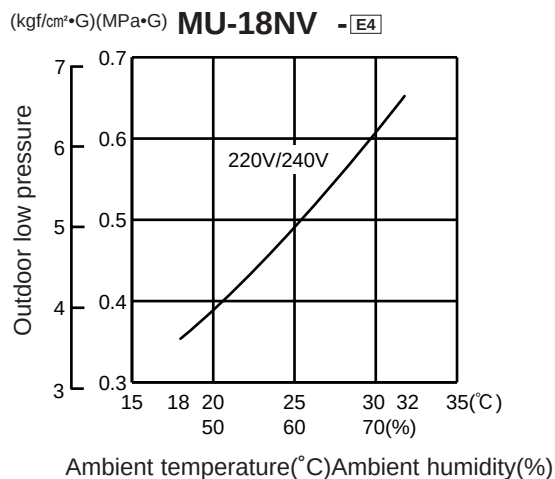
COOL operation

① Both indoor and outdoor unit are under the same temperature/humidity condition.

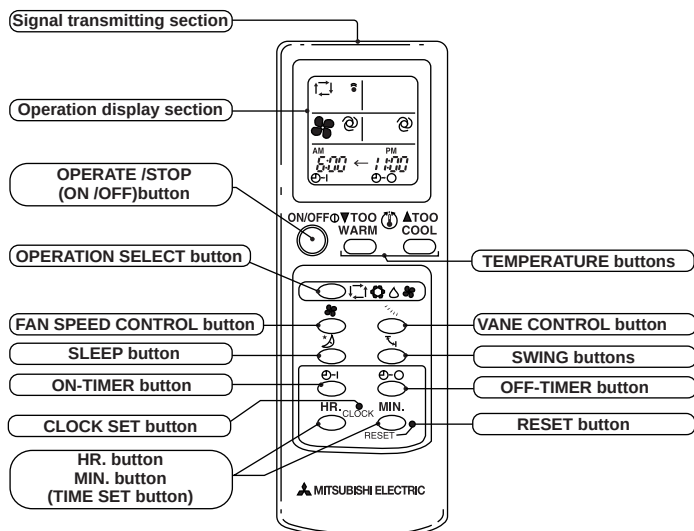
Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

② Air flow should be set at MAX.

③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa • G) =10.2(kgf/cm² • G)**



WIRELESS REMOTE CONTROLLER



MS-18NV -[E4]

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

8-1. "I FEEL CONTROL" (□) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button on the remote controller. Operation Indicator lamp of the indoor unit turns on with a beep tone.
- (2) Select "I FEEL CONTROL" (□) mode with the OPERATION SELECT button.
- (3) The operation mode is determined by the room temperature at start-up of the operation.

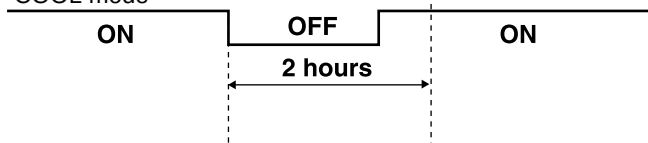
Initial room temperature	mode
25°C or more	COOL mode of "I FEEL CONTROL"
more than 13°C , less than 25°C	DRY mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (⌚→|) operation, the mode is determined according to the room temperature as the operation starts.
- When the system is stopped with the OPERATE/STOP(ON/OFF) button on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (□) mode, the system operates in previous mode automatically regardless of the room temperature.

Example

Previous operation
COOL mode of "I FEEL CONTROL" or COOL mode

Restart
COOL mode of "I FEEL CONTROL"

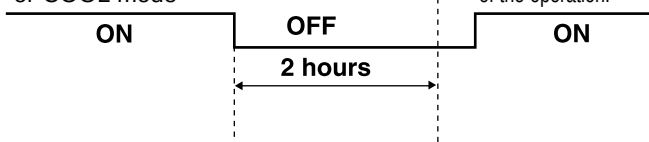


When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

Example

Previous operation
COOL mode of "I FEEL CONTROL" or COOL mode

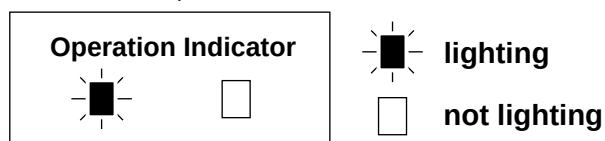
Restart
COOL or DRY mode of "I FEEL CONTROL" that determined by room temperature at start-up of the operation.



INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

The operation indicator at the right side of the indoor unit indicates the operation state.



Indication	Operation state	Difference between set temperature and room temperature
	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	About 2 °C or more
	This shows that the room temperature is approaching the target temperature.	About 2 °C or less

(4) The initial set temperature is decided by the initial room temperature.

Mode	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	※1
	25℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	more than13℃ , less than 25℃	Initial room temperature minus 2℃	

※1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURES buttons

In "I FEEL CONTROL" () mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm. Each time the TOO WARM or TOO COOL button is pressed, the indoor unit receives the signal and emits a beep tone.

● Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

▲ TOO

COOL ... To raise the set temperature 1~2 degrees(°C)



▼ TOO

WARM ... To lower the set temperature 1~2 degrees(°C)

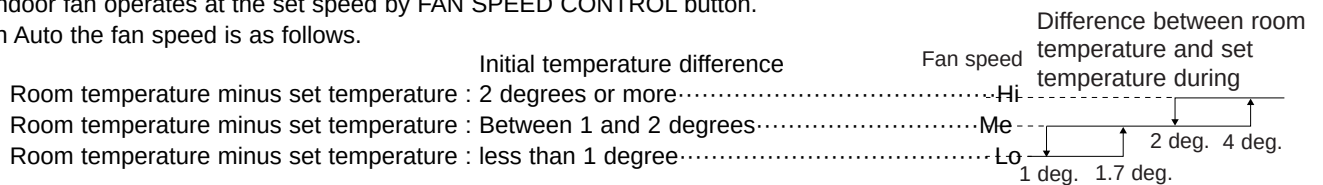


— COOL mode of "I FEEL CONTROL" —

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In Auto the fan speed is as follows.



2. Coil frost prevention

① Temperature control

When the indoor coil thermistor RT12 reads -1°C or below, the coil frost prevention mode starts immediately.

However, the coil frost prevention doesn't work after 5 minutes since the compressor has started.

Indoor fan operates at the set speed and the compressor stops for 5 minutes.

After that, if RT12 still reads below -1°C this mode is prolonged until the RT12 reads over -1°C.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

a. Compressor has been continuously operating.

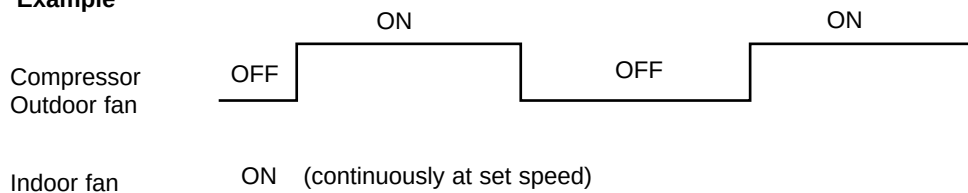
b. Indoor fan speed is Lo or Me.

c. Room temperature is below 26°C.

When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes Hi or the room temperature exceeds 26°C. However, when two of the above conditions (b. and c.) are satisfied again, time accumulation is resumed.

Operation chart Example



—DRY mode of “I FEEL CONTROL”—

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the room temperature.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

However, in AUTO fan operation, fan speed becomes Lo.

2. The operation of the compressor and indoor fan/ outdoor fan

Compressor operates by room temperature control and time control.

Set temperature is controlled to fall 2°C from initial room temperature.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

- When the room temperature is 23°C or over:

When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.

When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

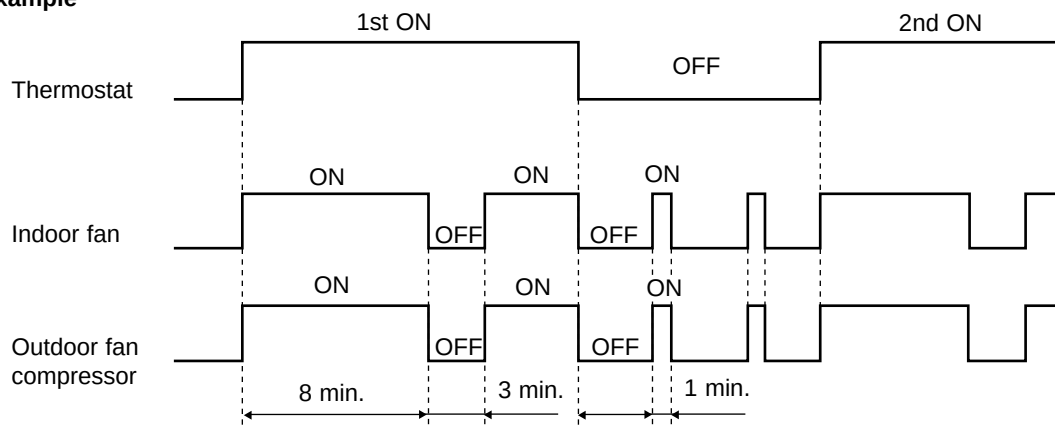
- When the room temperature is under 23°C.

When the thermostat is ON, the compressor repeats 2 minutes ON and 3 minutes OFF.

When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Operation time chart

Example



3. Coil frost prevention

- The operation is as same as coil frost prevention during COOL mode of “I FEEL CONTROL”.

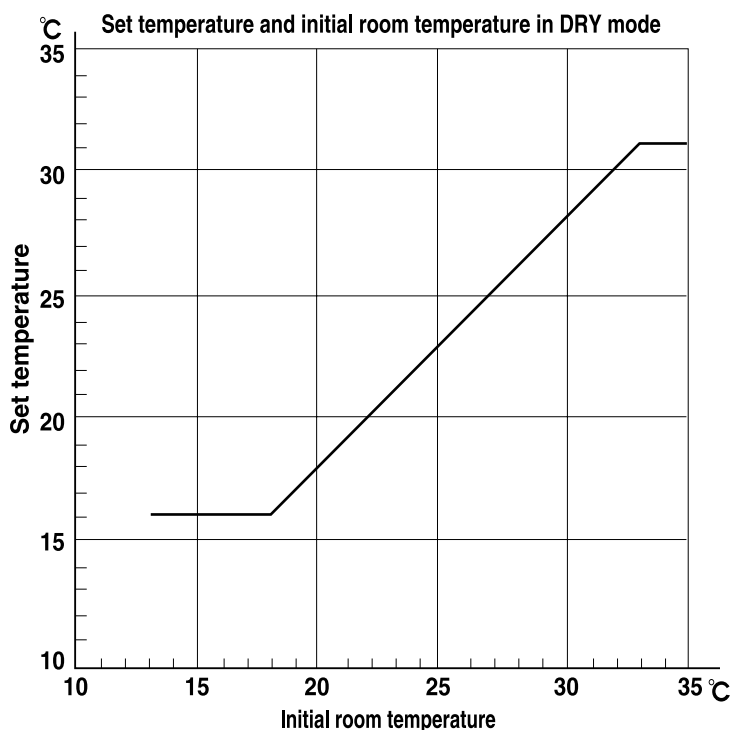
- Indoor fan operates at the set speed and the compressor stops for 5minutes, because protection (Coil frost prevention)has the priority. However when coil frost prevention works while the compressor is not operating, it's speed becomes Lo.

8-2. COOL (❄) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.
Operation Indicator lamp of the indoor unit turns on with a beep tone.
- (2) Select COOL mode with the OPERATION SELECT button.
- (3) Press the TEMPERATURES button.
(TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
 - ※ Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.
 - ※ Coil frost prevention is as same as COOL mode of "I FEEL CONTROL".

8-3. DRY (☹) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.
Operation Indicator lamp of the indoor unit turns on with a beep tone.
- (2) Select DRY mode with the OPERATION SELECT button.
- (3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
Thermostat (SET TEMP.) does not work.
The other operations are same as DRY mode of "I FEEL CONTROL".
- (4) DRY operation will not function when the room temperature is 13°C or below.
- (5) When DRY operation functions, the fan speed is lower than cool operation.

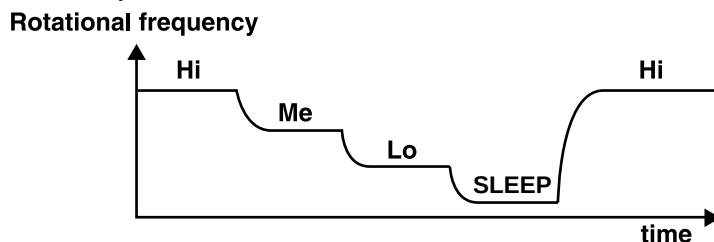


8-4. FAN (⚙) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.
- (2) Select FAN mode with the OPERATION SELECT button.
- (3) Select the desired fan speed. When AUTO, it becomes Lo.
Only indoor fan operates. Outdoor unit does not operate.

8-5. FAN MOTOR CONTROL

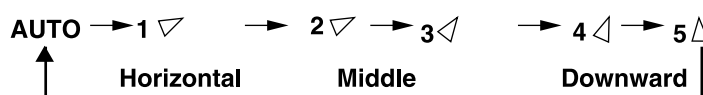
- (1) Rotational frequency feedback control
The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (Hi, Me, Lo, SLEEP), the microprocessor controls IC141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



- (2) Fan motor lock-up protection
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the Operation Indicator lamp flashes on and off to show the fan motor abnormality. (See page 19.)

8-6. AUTO VANE OPERATION

- (1) Vane motor drive
These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.
- (2) The horizontal vane angle and mode changes as follows by pressing the VANE CONTROL (⚙) button.



(3) Positioning

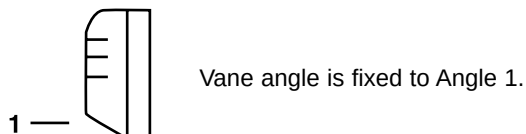
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

- (a) When the OPERATE/STOP(ON/OFF) button is pressed.
- (b) When the vane control is changed from AUTO to MANUAL.
- (c) When the SWING is finished.
- (d) When the test run starts.
- (e) When the power supply turns ON.

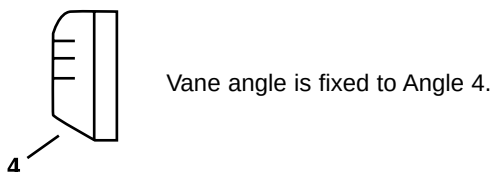
(4) VANE AUTO () mode

In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



② In FAN operation



(5) Dew prevention

During COOL or DRY operation at Vane Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(6) SWING MODE ()

By pressing the SWING button (), the horizontal vane swings vertically. The remote controller displays “  ”. SWING mode is cancelled when the SWING button or VANE CONTROL button () is pressed the mode is changed.

8-7. SLEEP MODE ()

- When the SLEEP button () is pressed, the indoor fan speed drops and the air flow sound from the indoor unit is decreased.
- The indications of the remote controller are “  ” and “  ”.
- When the FAN SPEED CONTROL button () or the SLEEP button () or mode change button is pressed during the SLEEP mode, the SLEEP mode is released.

8-8. TIMER OPERATION

1. How to set the timer

- (1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.
- (2) Check that the current time is set correctly.

NOTE : Timer operation will not work without setting the current time. Initially “AM0:00” blinks at the current time display of TIMER MONITOR, so set the current time correctly with CLOCK SET button.

- (3) Press TIMER CONTROL button to select the operation.

“  → | ” button... AUTO START operation (ON timer)

“  → ○ ” button... AUTO STOP operation (OFF timer)

- (4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when “  → | ” or “  → ○ ” mark is flashing.

These marks disappear in 1 minute.

After setting the ON timer, check that Operation Indicator lamp of the indoor unit lights.

NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

2. Cancel

Timer setting can be cancelled with the TIMER CONTROL buttons. ("⌚→|" or "⌚→○")

To cancel the ON timer, press the "⌚→|" button.

To cancel the OFF timer, press the "⌚→○" button.

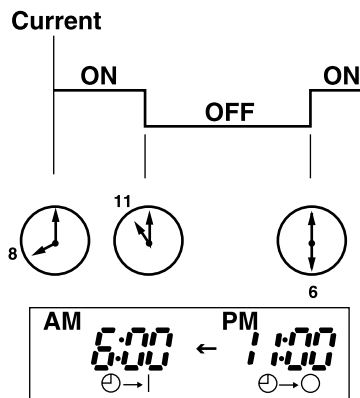
Timer is cancelled and the display of set time disappears.

PROGRAM TIMER

- The OFF timer and ON timer can be used in combination.
- "→" and "←" display shows the order of the OFF timer and ON timer operation.

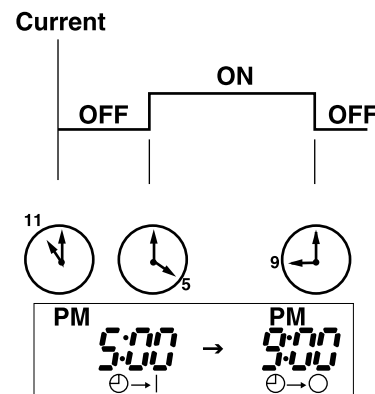
(Example 1) The current time is 8:00 PM.

The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.

The unit turns on at 5:00 PM, and off at 9:00 PM.



NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

8-9. EMERGENCY-TEST OPERATION

When the remote controller is missing, has failed or when the batteries run down, press the EMERGENCY OPERATION switch on the front of the indoor unit. The unit will start and the Operation Indicator lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at high notch and the system is in continuous operation. (The thermostat is ON.)

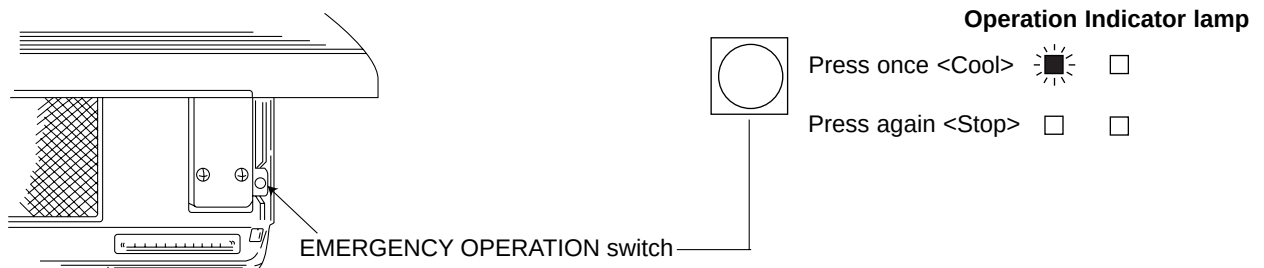
After 30 minutes of test run operation the system shifts to EMERGENCY COOL MODE with a set temperature of 24°C. The fan shifts to Me notch.

This operation continues until the EMERGENCY OPERATION switch is pressed again or the unit receives any signal from the remote controller. In case of latter normal operation will start.

The coil frost prevention works even in this operation.

In the test run or Emergency operation, the horizontal vane operates in VANE AUTO mode.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.



MS-18NV -[E4]**9-1. TIMER SHORT MODE**

For service, set time can be shortened by short circuit of JPG and JPS on the electronics control P.C. board.

The time will be shortened as follows.

3-minutes delay : 3-minutes → 3-seconds.

AUTO START : 1 hour → 1-minute

AUTO STOP : 1 hour → 1-minute

} Short the connector during the timer mode.

9-2. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

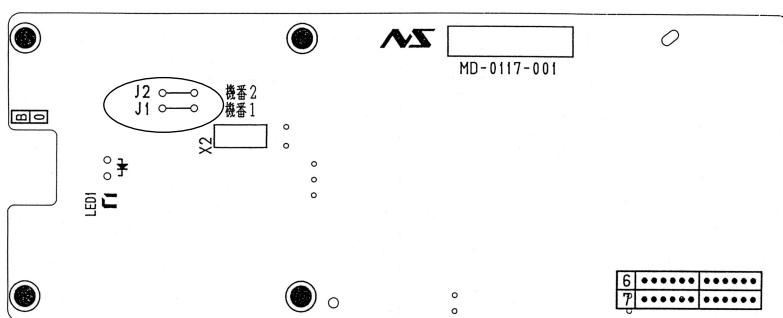
A maximum of 4 indoor units with wireless remote controllers can be used in a room.

In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the number of the indoor unit.

How to modify the remote controller P.C. board

Remove batteries before modification.

The board has a print as shown below :



NOTE : For remodelling, take out the batteries at first.
After finish remodelling, put back the batteries then push the RESET button.

The P.C.board has the print “J1” and “J2”. Jumper wires are mounted to each “J1” and “J2”. Cut J1 and J2 according to the number of indoor unit as shown in Table 1..

After modification, push the reset button.

Table 1.

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	–	Cut J1	Same as at left	Same as at left
No. 3 unit	–	–	Cut J2	Same as at left
No. 4 unit	–	–	–	Cut both J1 and J2

NOTE :

At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.

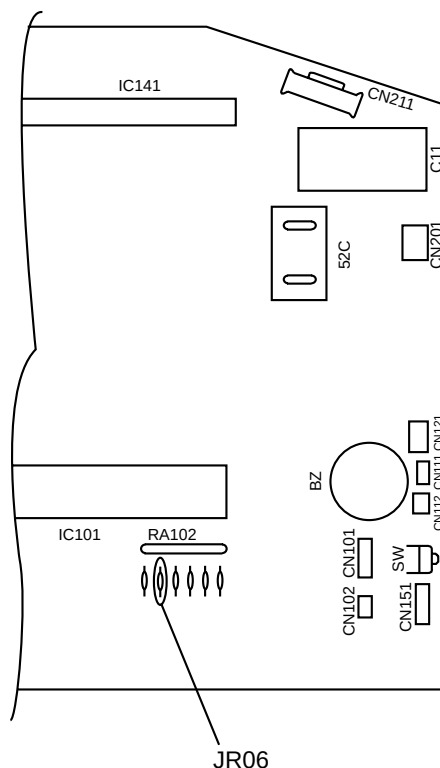
At setting-error, turn the power supply off to cancel the individual operation, and then turn the power supply on to restart the setting.

9-3. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The "AUTO RESTART FUNCTION" sets to work the moment power has restored after power failure. Then, the unit will restart automatically. However if the unit is operated in "I FEEL CONTROL." mode before power failure, the operation is not memorized. In "I FEEL CONTROL." mode, the operation is decided by the initial room temperature.

How to set "AUTO RESTART FUNCTION"

- ① Turn off the main power for the unit.
- ② Remove the electronic control P.C. board and the display P.C.board. (See page 24.)
- ③ Cut the RESISTOR JR06 on the indoor electronic control P.C.board.



Operation

- ① If the main power (220/240V AC) has been cut, the operation settings remain.
- ② After the power is restored, the unit restarts automatically according to the memory. (However, it takes at least 3 minutes for the compressor to start running.)

NOTE:

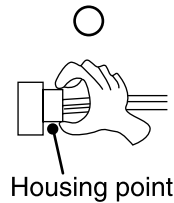
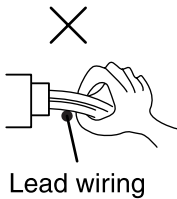
- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If main power is turned off or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected under the same power system, compressor starting current as large as that for all the compressors used flows at a time as soon as the units restart automatically. Therefore, the specific counter-measures are required to prevent main voltage drop or the rush of starting current by providing the system to allow the units to start in regular succession.

MS-18NV -[E4]**10-1. Cautions on troubleshooting****1. Before troubleshooting, check the following:**

- 1) Check the power supply voltage.
- 2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

- 1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
- 2) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
- 3) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.

**3. Troubleshooting procedure**

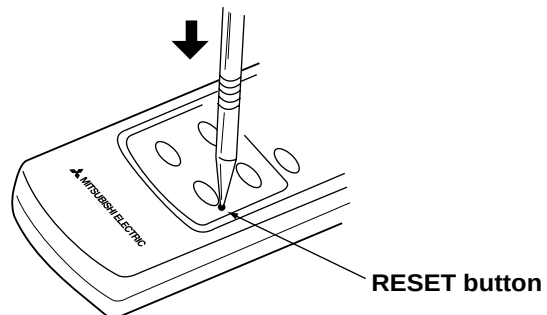
- 1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check the abnormality indication for 2 or 3 times before starting service work.
- 2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 3) When troubleshooting, refer to the flow chart and the check table on page 19.

4. How to replace batteries

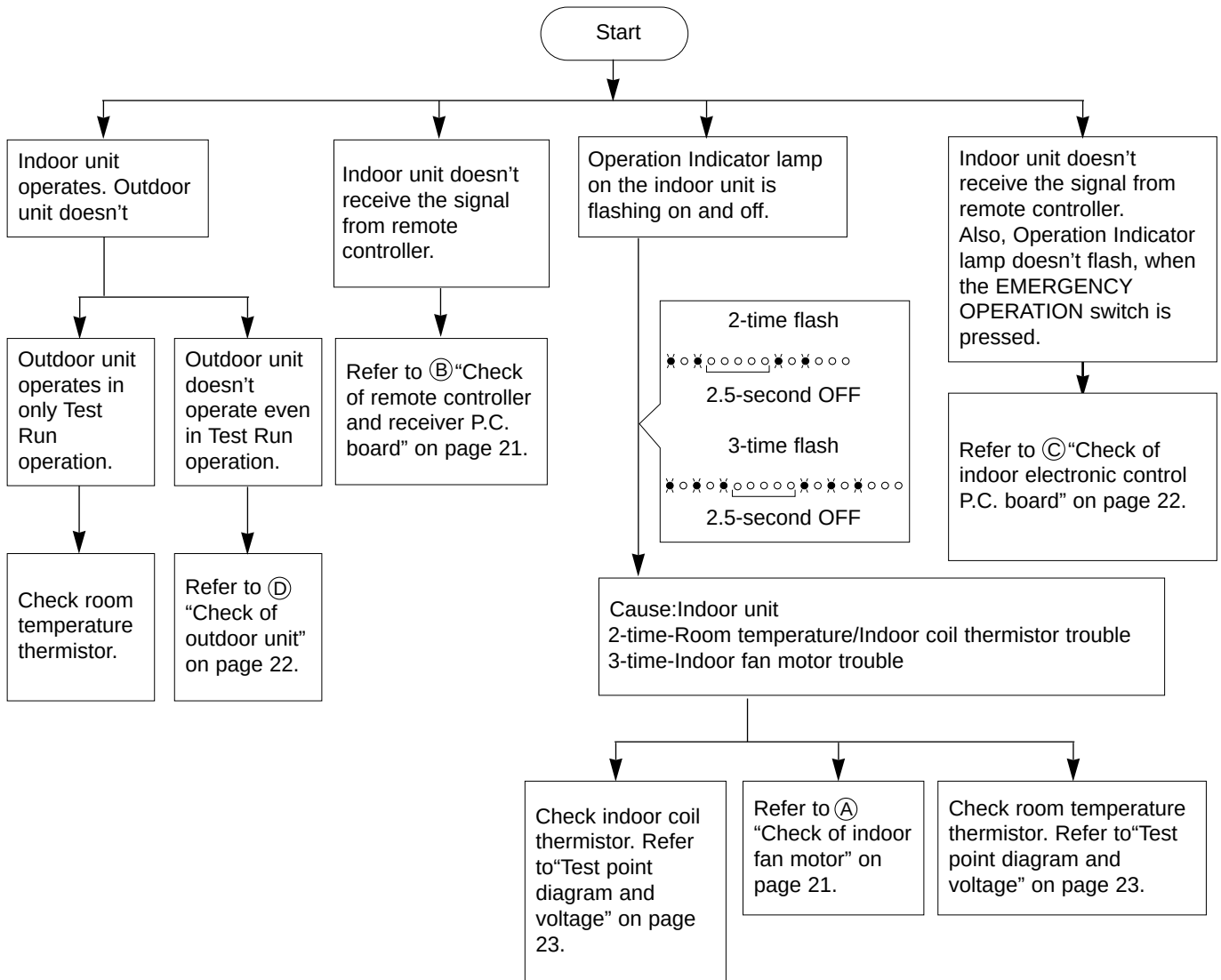
Weak batteries may cause the remote controller malfunction.

In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, discharge the remote controller in the following order.

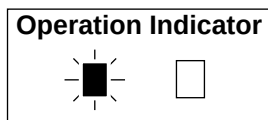
This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.



10-2. Instruction of troubleshooting



1. troubleshooting check table



※ Before taking measures, make sure that the symptom reappears for accurate troubleshooting.

Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Indoor coil thermistor Room temperature thermistor	2-time flash ●●●○○○○●●●○○○ 2.5-second OFF	Outdoor unit does not run.	Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	● Check thermistor calibration. ● Reconnect connector. ● Check indoor electronic control P.C. board.
2	Indoor fan motor	3-time flash ●●●●●○○○○●●●●●○○○ 2.5-second OFF	Indoor fan motor repeats 12 seconds ON and 3 minutes OFF. When the indoor fan motor breaks, the fan keeps stopping.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation	● Disconnect connector CN211 and then check connector CN121 ② - ③ to make sure rotational frequency feedback signal of 1.5V or over exists. ● Check indoor electronic control P.C. board. ● Check indoor fan motor. ● Reconnect connector.

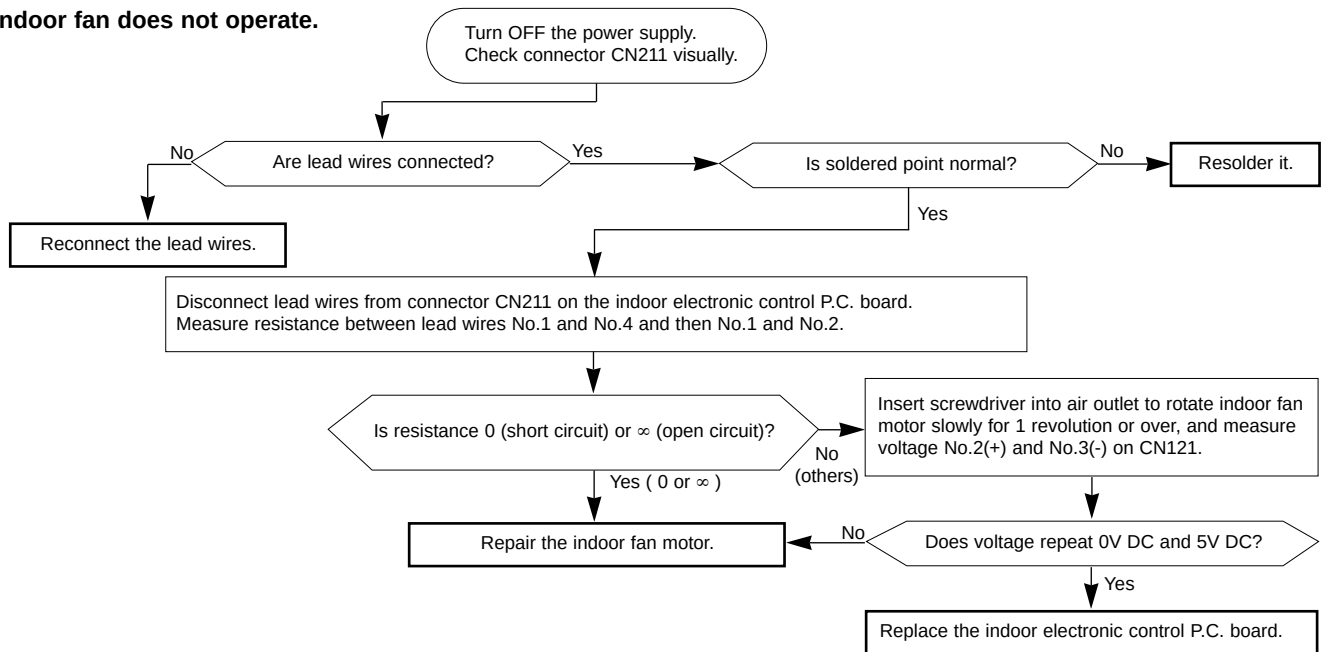
MS-18NV - [E4]

2. Trouble criterion of main parts

Part name	Check method and criterion		Figure									
Room temperature thermistor	Measure the resistance with a tester. (Part temperature 10℃ ~ 30℃)											
Indoor coil thermistor	<table><tr><td>Normal</td><td>Abnormal</td></tr><tr><td>8kΩ ~ 20kΩ</td><td>Opened or short-circuited</td></tr></table>	Normal		Abnormal	8kΩ ~ 20kΩ	Opened or short-circuited						
Normal	Abnormal											
8kΩ ~ 20kΩ	Opened or short-circuited											
Compressor	Measure the resistance between the terminals with a tester. (Coil wiring temperature −10℃ ~ 40℃)											
	<table><tr><td></td><td>Normal</td><td>Abnormal</td></tr><tr><td>C-R</td><td>0.95 ~ 1.17Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>C-S</td><td>1.92 ~ 2.36Ω</td></tr></table>			Normal	Abnormal	C-R	0.95 ~ 1.17Ω	Opened or short-circuited	C-S	1.92 ~ 2.36Ω		
		Normal		Abnormal								
	C-R	0.95 ~ 1.17Ω	Opened or short-circuited									
C-S	1.92 ~ 2.36Ω											
Indoor fan motor	Motor part	Measure the resistance between the terminals with a tester. (Coil wiring temperature 10℃ ~ 30℃)										
		<table><tr><td></td><td>Normal</td><td>Abnormal</td></tr><tr><td>WHT-BLK</td><td>176 ~ 192Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>240 ~ 261Ω</td></tr></table>			Normal	Abnormal	WHT-BLK	176 ~ 192Ω	Opened or short-circuited	BLK-RED	240 ~ 261Ω	
			Normal		Abnormal							
	WHT-BLK	176 ~ 192Ω	Opened or short-circuited									
	BLK-RED	240 ~ 261Ω										
	Sensor part	Measure the voltage Power ON.										
<table><tr><td></td><td>Normal</td><td>Abnormal</td></tr><tr><td>BRN-YLW</td><td>4.5 ~ 5.5V</td><td rowspan="2">Remain 0V or 5V</td></tr><tr><td>YLW-GRY</td><td>(When fan revolved one time) 0V→5V→0V (Approx.)</td></tr></table>			Normal	Abnormal	BRN-YLW	4.5 ~ 5.5V	Remain 0V or 5V	YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)			
		Normal	Abnormal									
BRN-YLW	4.5 ~ 5.5V	Remain 0V or 5V										
YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)											
Outdoor fan motor	Measure the resistance between the terminals with a tester. (Coil wiring temperature −10℃ ~ 40℃)											
	<table><tr><td></td><td>Normal</td><td>Abnormal</td></tr><tr><td>WHT-BLK</td><td>102 ~ 126Ω</td><td rowspan="3">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>97.9 ~ 120Ω</td></tr></table>			Normal	Abnormal	WHT-BLK	102 ~ 126Ω	Opened or short-circuited	BLK-RED	97.9 ~ 120Ω		
		Normal		Abnormal								
	WHT-BLK	102 ~ 126Ω		Opened or short-circuited								
	BLK-RED	97.9 ~ 120Ω										
Vane motor	Measure the resistance between the terminals with a tester. (Part temperature 10℃ ~ 30℃)											
	<table><tr><td>Normal</td><td>Abnormal</td></tr><tr><td>358 ~ 388Ω</td><td>Opened or short-circuited</td></tr></table>	Normal		Abnormal	358 ~ 388Ω	Opened or short-circuited						
	Normal	Abnormal										
358 ~ 388Ω	Opened or short-circuited											

A Check of indoor fan motor

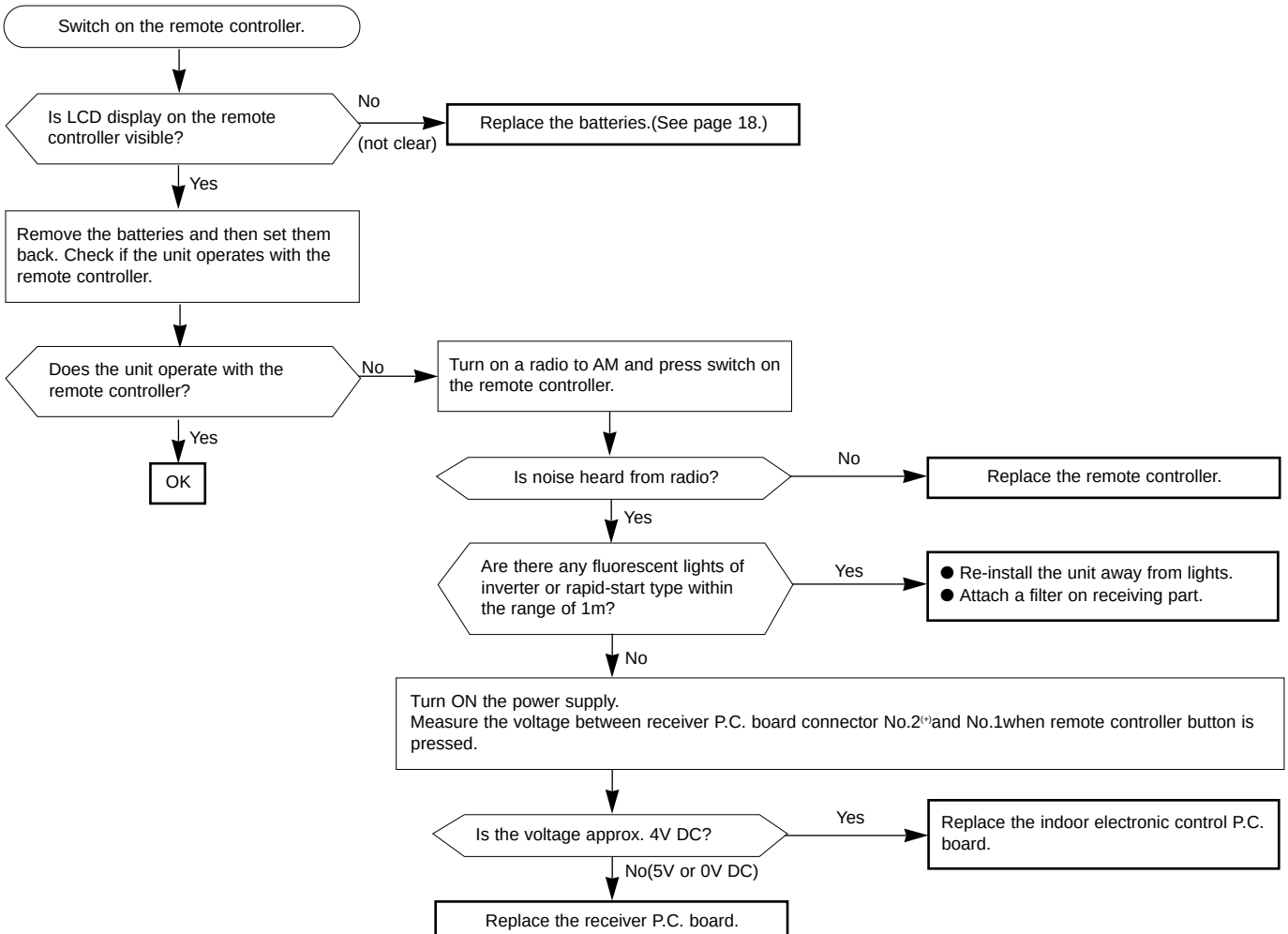
Indoor fan does not operate.



B Check of remote controller and receiver P.C. board

Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.

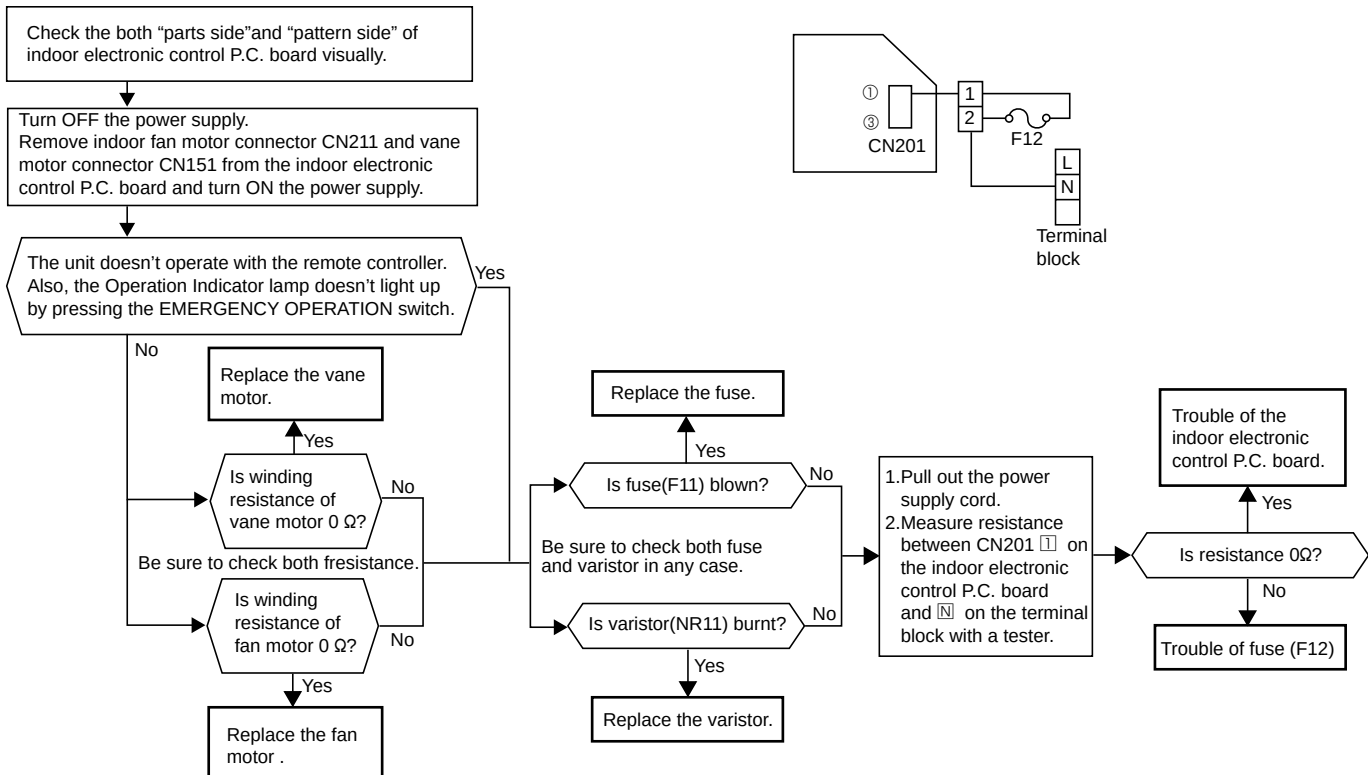
*Check if the remote controller is exclusive for this air conditioner.



© Check of indoor electronic control P.C. board

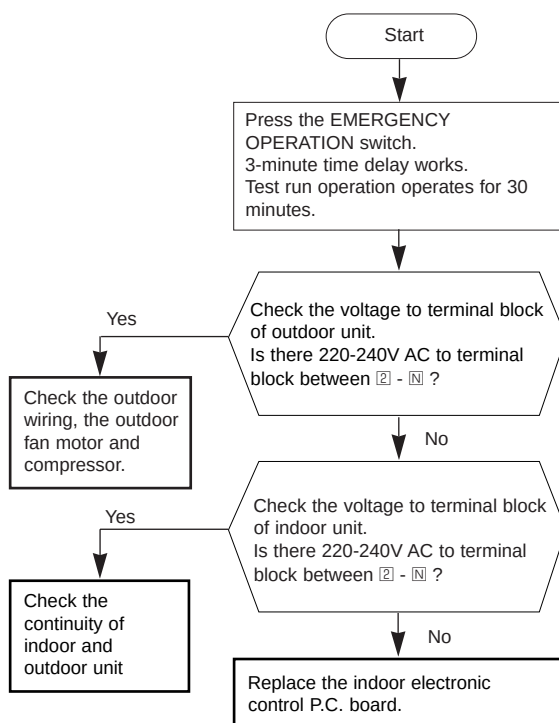
The unit doesn't operate with the remote controller.

Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.



④ Check of outdoor unit

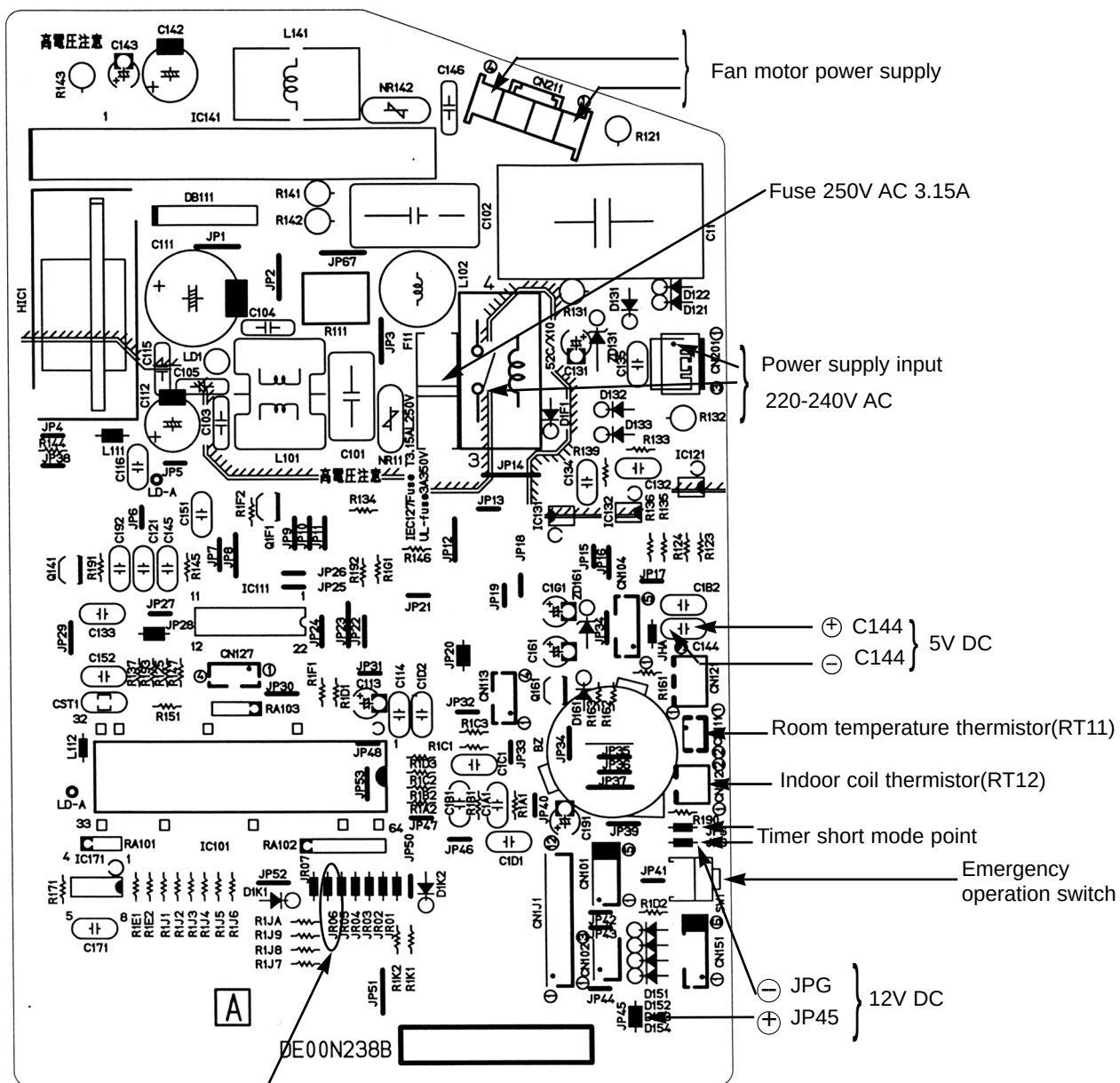
Compressor and outdoor fan do not operate.(Only indoor fan operates.)



TEST POINT DIAGRAM AND VOLTAGE

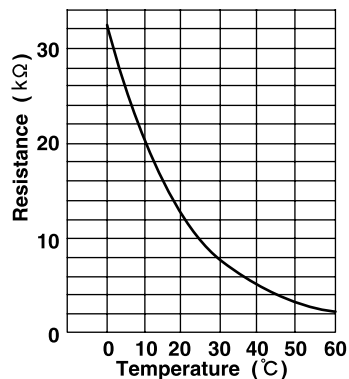
MS-18NV - [E4]

Indoor electronic control P.C. board



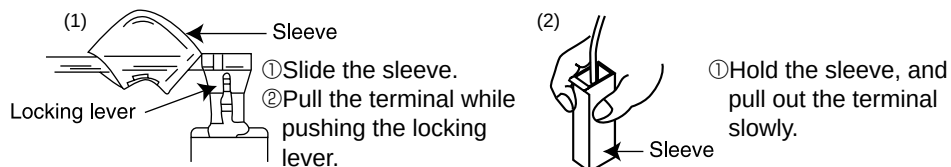
Auto restart function
Cut the Resistor JR06.
(Refer page 17.)

Room temperature thermistor (RT11)
Indoor coil thermistor (RT12)



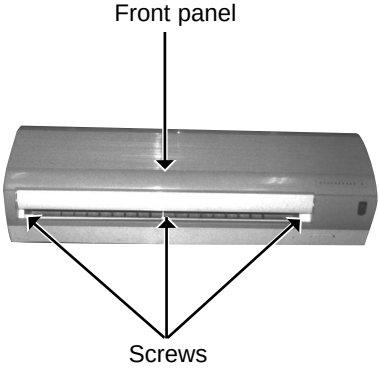
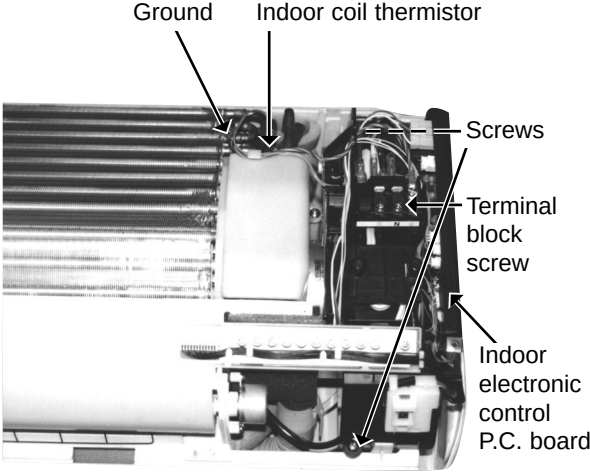
<"Terminal with lock mechanism" Detaching points>

In case of a terminal with lock mechanism, detach the terminal as shown below.



11-1. MS-18NV -E4

INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screws caps at the down of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	Photo 1  Front panel Screws
2. Removing the electronic control P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Remove the screw, remove the terminal cover. (4) Remove the screw on the terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder. (7) Disconnect the connectors and the lead wire from 52C relay on the electronic control P.C. board and remove the ground and the indoor coil thermistor. (8) Remove the electronic control P.C. board.	Photo 2  Ground Indoor coil thermistor Screws Terminal block screw Indoor electronic control P.C. board

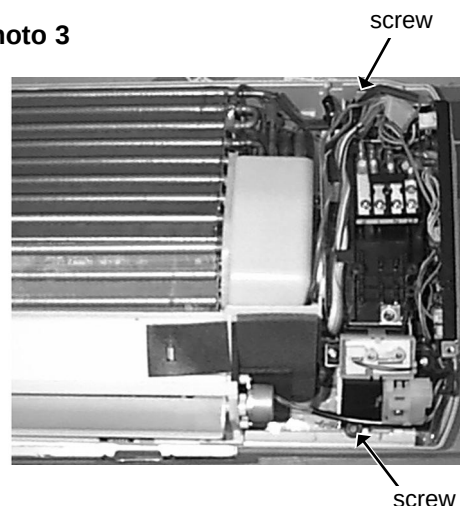
OPERATING PROCEDURE

3. Removing the electrical box

- (1) Remove the front panel. (Refer to 1)
- (2) Remove the electrical cover.
- (3) Disconnect the connector of the indoor coil thermistor.
- (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board.
- (5) Remove the screw of the electrical box, remove the electrical box.

PHOTOS

Photo 3



4. Removing the indoor fan motor and the line flow fan

- (1) Remove the front panel.
- (2) Remove the electrical box.
- (3) Unhook the catches on the both sides of the nozzle assembly.
- (4) Remove the nozzle assembly.
- (5) Remove the screws of the bearing support.
- (6) Remove the screw of the heat exchanger unhook the catch.
- (7) Lifting the heat exchanger, remove the bearing support.
- (8) Remove the motor support.
- (9) Loose the screw fixing the line flow fan, remove the line flow fan.
- (10) Remove the screws of the motor band, remove the fan motor.

Photo 4

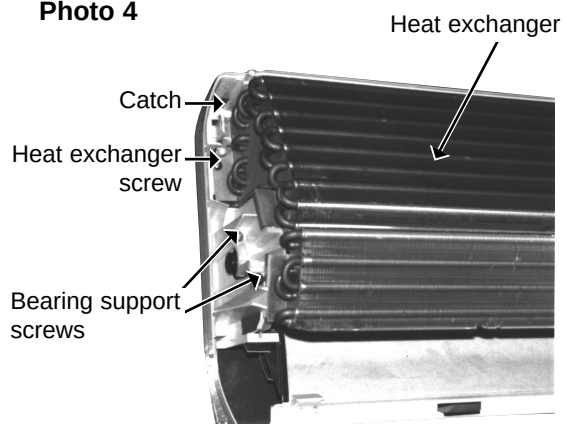
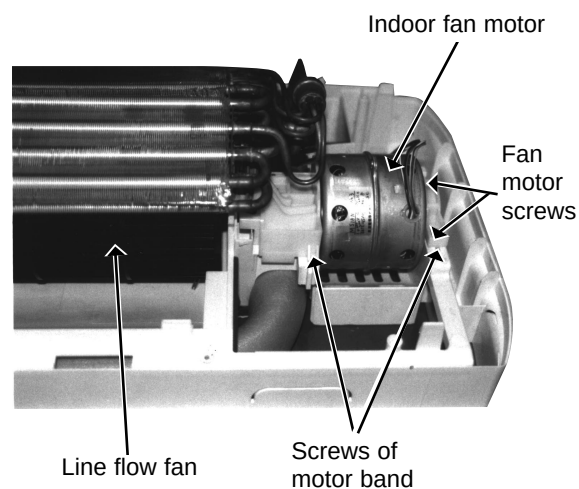
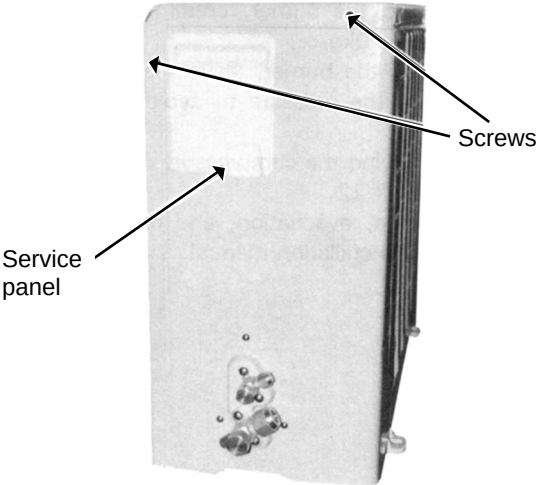
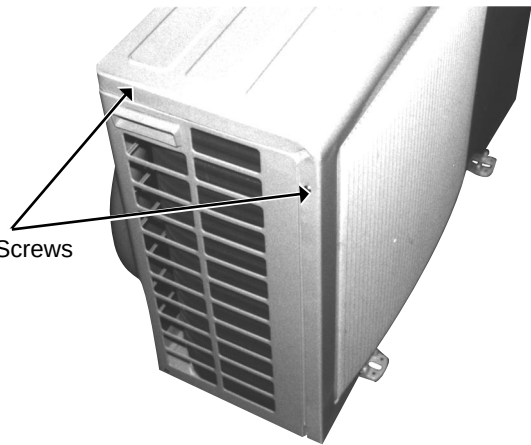
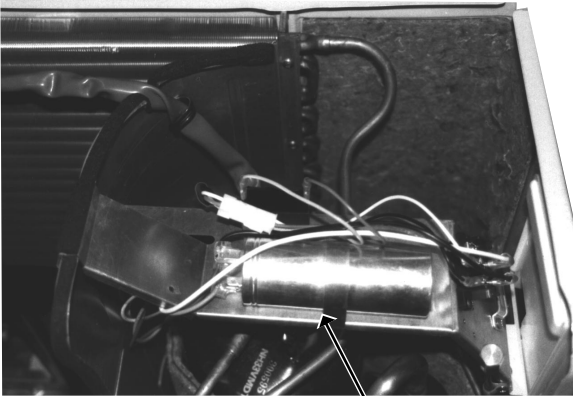


Photo 5

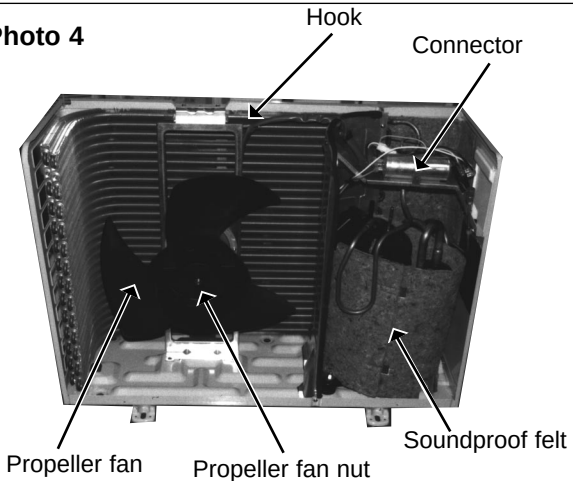
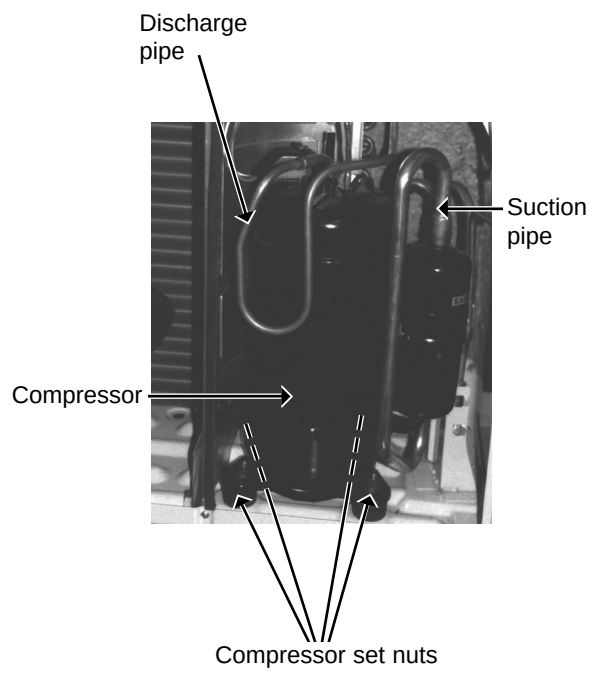


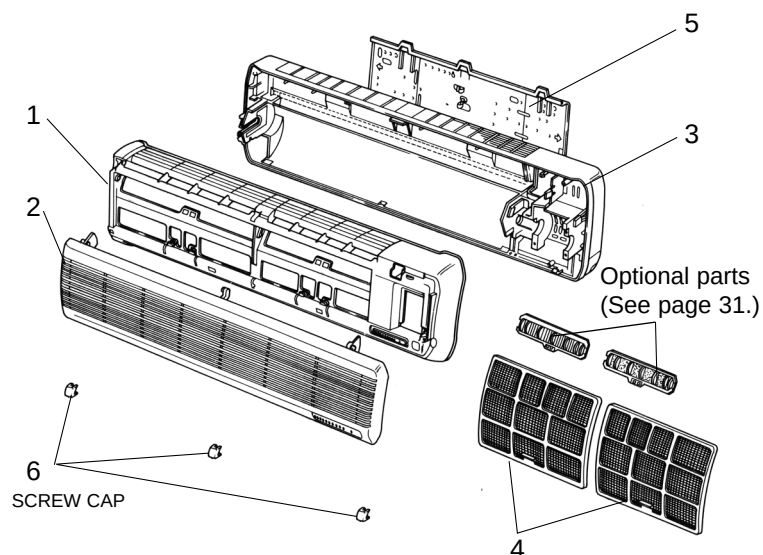
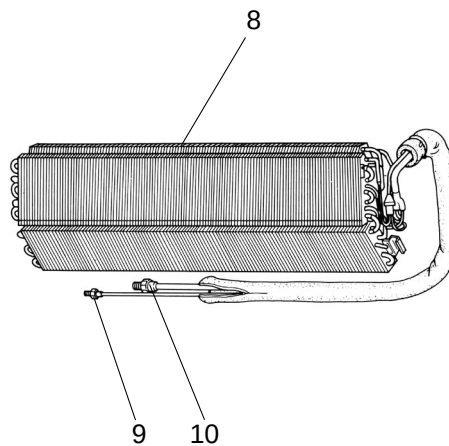
11-2. MU-18NV - E4

OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the bottom of the cabinet on the both side to remove the cabinet.	Photo 1  Photo 2 
2. Removing the electrical parts (1) Remove the service panel and the cabinet. (2) Remove the following parts. •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block	Photo 3 



OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Disconnect the connector remove the hooked lead wire from the fan motor. (3) Remove the propeller nut and remove the propeller fan. (4) Remove screws securing the fan motor.	Photo 4  Hook Connector Propeller fan Propeller fan nut Soundproof felt
4. Removing the compressor (1) Remove the cabinet. (Refer to 1) (2) Remove the soundproof felt. (3) Remove the terminal cover on the compressor (4) Disconnect lead wires from the glass terminal of the compressor. (5) Release gas from the refrigerant circuit. (6) Disconnect the welded part of the discharge pipe. (7) Disconnect the welded part of the suction pipe. (8) Remove nuts fixing the compressor. (9) Remove the compressor.	Photo 5  Discharge pipe Suction pipe Compressor Compressor set nuts

MS-18NV -E4 (WH)12-1. INDOOR UNIT
STRUCTURAL PARTS12-2. INDOOR UNIT
HEAT EXCHANGER

12-1. INDOOR UNIT STRUCTURAL PARTS

Part number that is circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MS-18NV- E4 (WH)	
1	E02 138 000	FRONT PANEL (WH)		1	
2	E02 138 010	GRILLE (WH)		1	
3	E02 143 234	BOX (WH)		1	
4	E02 141 100	AIR FILTER		2	
5	E02 141 970	INSTALLATION PLATE		1	
6	E02 143 067	SCREW CAP (WH)		3	3PCS/SET
⑦	E02 171 007	LAMP PANEL (WH)		1	

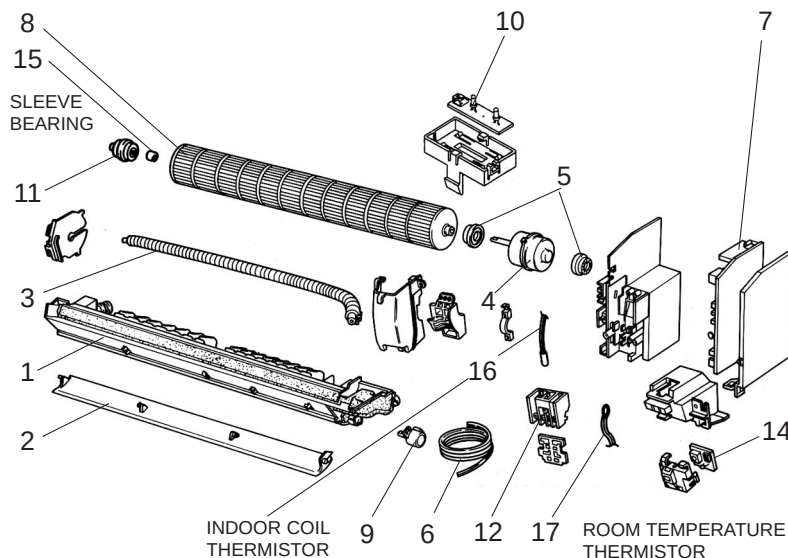
12-2. INDOOR UNIT HEAT EXCHANGER

8	E02 141 620	INDOOR HEAT EXCHANGER		1	
9	E02 138 667	UNION(LIQUID)		1	φ6.35
10	E02 138 666	UNION(GAS)		1	φ15.88

MS-18NV -E4 (WH)

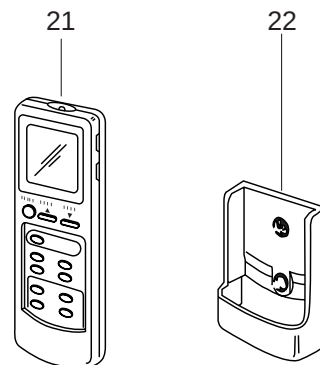
12-3. INDOOR UNIT

FUNCTIONAL PARTS AND ELECTRICAL PARTS



12-4. ACCESSORY PARTS

AND REMOTE CONTROLLER



12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

Part number that are circled are not shown in the illustration.

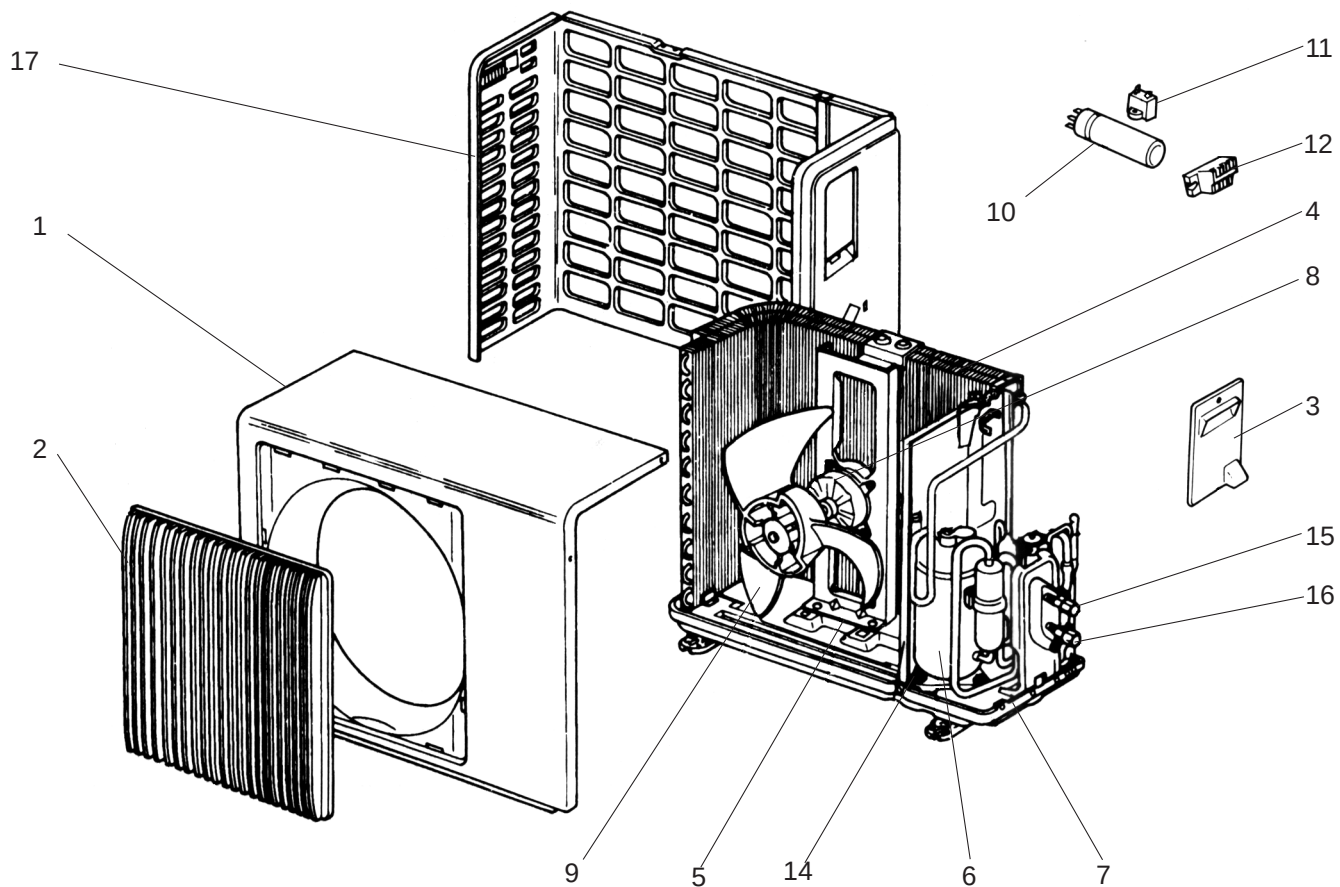
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MS-18NV- E4 (WH)	
1	E02 143 235	NOZZLE (WH)		1	
2	E02 143 040	VANE (WH)		1	
3	E02 141 702	DRAIN HOSE		1	
4	E02 141 300	INDOOR FAN MOTOR	MF	1	RA4V27 -□□
5	E02 001 505	RUBBER MOUNT		2	2PCS/SET
6	E02 138 395	POWER SUPPLY CORD		1	
7	E02 443 452	ELECTRONIC CONTROL P.C. BOARD		1	AUTO RESTART
8	E02 141 302	LINE FLOW FAN		1	
9	E02 141 303	VANE MOTOR	MV	1	
10	E02 138 329	DISPLAY P.C. BOARD		1	
11	E02 141 509	BEARING MOUNT		1	
12	E02 197 375	TERMINAL BLOCK	TB	1	
13	E02 085 385	VARISTOR	NR11	1	
14	E02 141 468	RECEIVER P. C. BOARD		1	
15	E02 001 504	SLEEVE BEARING		1	
16	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	
17	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
18	E02 127 382	FUSE	F11	1	3.15A
19	E02 205 381	THERMAL FUSE	F12	1	93°C
20	E02 138 383	SURGE ABSORBER	DSAR	1	

12-4. ACCESSORY PARTS AND REMOTE CONTROLLER

21	E02 138 426	REMOTE CONTROLLER		1	
22	E02 141 083	REMOTE CONTROLLER HOLDER		1	

MU-18NV - E4

12-5. OUTDOOR UNIT STRUCTURAL PARTS



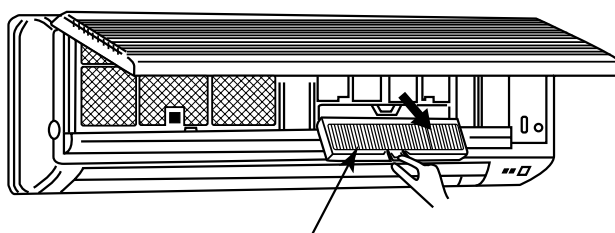
Part number that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MU-18NV- E4	
1	E02 141 232	CABINET		1	
2	E02 141 521	GRILLE		1	
3	E02 141 245	SERVICE PANEL		1	
4	E02 217 630	OUTDOOR HEAT EXCHANGER		1	
5	E02 140 515	MOTOR SUPPORT		1	
6	E02 217 900	COMPRESSOR	MC	1	PH-33VPET
7	E02 217 290	BASE		1	
8	E02 144 301	OUTDOOR FAN MOTOR	MF	1	RA6V50 - □ □
9	E02 141 501	PROPELLER FAN		1	
10	E02 082 353	COMPRESSOR CAPACITOR	C1	1	50 μ F/440V
11	E02 138 351	OUTDOOR FAN CAPACITOR	C2	1	3.0 μ F/440V
12	E02 197 374	TERMINAL BLOCK	TB	1	
13	E02 138 936	CAPILLARY TUBE		1	ϕ 3.0 $\times$ ϕ 2.0 $\times$ 700
14	E02 138 506	COMPRESSOR RUBBER SET		4	4RUBBERS/SET
15	E02 139 662	STOP VALVE(LIQUID)		1	ϕ 6.35
16	E02 150 661	STOP VALVE(GAS)		1	ϕ 15.88
17	E02 140 233	BACK PANEL		1	
18	E02 095 382	FUSE	F	1	250V/2A

13-1. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 3 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

Model	Part No.
MS-18NV - E4	MAC-1100FT

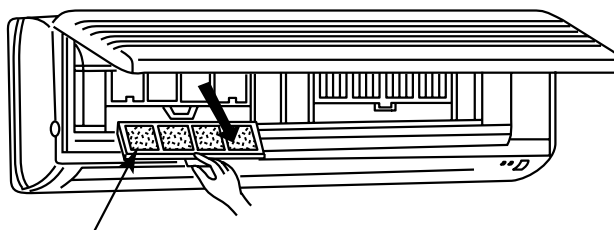


Air cleaning filter (White bellows type)

13-2. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- When the filter color is still dark even after cleaning, replace the filter with a new one.
Replace the filter at least once a year.

Model	Part No.
MS-18NV - E4	MAC-1600DF



Deodorizing filter (Gray sponge type)

- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.



HEAD OFFICE MITSUBISHI DENKI BLDG.MARUNOUCHI TOKYO100-8310 TELEX J24532 CABLE MELCO TOKYO